



Earth Consultants Inc.

Geotechnical Engineering and Geology

July 15, 1987

E-3454

Duwamish Shipyard, Inc.
5658 W. Marginal Way S.W.
Seattle, Washington 98106
Attention: David Larsen/Don Meberg

Subject: Preliminary Environmental Audit, Duwamish Shipyard

Gentlemen:

In response to your recent request, Earth Consultants, Inc. (ECI) has completed a preliminary environmental audit of the referenced property. This brief report summarizes our approach to the project along with our preliminary findings.

METHODOLOGY/SCOPE OF WORK

The scope of work for this assessment consisted of the following tasks:

- Review of available information obtained from various sources with respect to historical use of the property.
- Visual reconnaissance of the subject property including building interiors and grounds; photo documentation of selected points of interest was also developed.
- Preparation of the written report.

FINDINGS

Site Use History

Information regarding the developmental history of the site was gathered from various sources including the archives of the county tax assessor, map library resources of the University of Washington, and in conversations with individuals having specific knowledge of site development details.



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Duwamish Shipyard, Inc.
July 15, 1987

E-3454
Page Two

Perhaps one of the more valuable contacts during our review of site history was a telephone conversation with David Larsen, current operator of the shipyard. Mr. Larsen's family has owned the subject property and been actively engaged in the shipyard business for decades. From our conversation, the following chronology of development and land use was established:

- 1939: (b)(6), Mr. Aksel Larsen purchased the subject property and shortly thereafter constructed a marine railway at the location of the existing railway as shown on the attached site map, Plate 1.
- 1940's David Larsen remembered visiting the site many times as a child. His description of the land at that time indicates that an elevated dirt roadway extended from West Marginal Way out to the vicinity of the existing marine railway and office building, and that the land in between was an undeveloped alder wood lowland.

Adjacent to the south property boundary, a chemical manufacturing concern operated during the war, and German prisoners of war were reportedly employed under guard. The nature of their business was not determined during our survey.

The property to the north of the subject site remained in native, undisturbed condition until the mid-1940's when extensive excavation was undertaken in the construction of a large graving dock, a type of immovable dry dock reliant upon control gates, tidal action and auxiliary pumps to maintain a dry work area for ship repair. The soil removed from this excavation was placed as fill upon the Duwamish Shipyard property in the area between the existing office and West Marginal Way. The significance of this observation with respect to the current environmental audit is that it documents the source for the fill material, which as we have noted in earlier paragraphs was an undeveloped non-industrial lowland prior to excavation of the graving dock.

1940- 1950's- Work at the shipyard focused primarily on wooden boats including construction for the U.S. Army.

post- 1950's- Steel boat fabrication and repair began in 1950's; by the end of the 1950's, steel boats were the

Duwamish Shipyard, Inc.
July 15, 1987

E-3454
Page Three

primary focus. The environmental significance of this transition from wooden to steel boats is that it establishes a rough time reference for the start of sandblasting activities commonly associated with steel craft. As discussed in subsequent sections of this report, some of the "sand" used for the sandblasting contained heavy metals now considered to be toxic in sufficient concentrations.

1940- 1980's- Filled area is gradually paved in various stages to control muddy conditions and make greater use of land.

- 1982- In an effort to deepen channel access and improve waterfront operations, materials are dredged, and banks are stabilized with rip-rap following completion of necessary EIS procedures.

During our conversation with Mr. Larsen, we asked if any fills other than those from the graving dock on the property to the north had ever been placed on the property, and the answer was no. On the basis of our conversation with him, and from our review of other records pertaining to historical use, nothing in the apparent history of the use of property would suggest that the property has been the recipient of wastes from other industrial sites.

Site Reconnaissance

On July 2, 1987, a senior environmental scientist from Earth Consultants, Inc., visited the subject site to meet with and interview key personnel, and to make a visual review of the buildings and grounds to look for evidence of hazardous or toxic materials or wastes.

The attached site sketch map, Plate 1, documents the general configuration and layout of the subject property in relation to the Duwamish Waterway and surrounding features including the graving dock.

Building Areas

A total of eleven (11) buildings were noted on the site at the time of our visit. The following discussion briefly describes the function of each of the structures in the current operational scheme; the letter designations are provided to facilitate easy comparison to details of the site map, Plate 1.

Duwamish Shipyard, Inc.
July 15, 1987

E-3454
Page Four

Building A- Building A serves as a warehouse for more sensitive ship's components brought to the subject site including engines, lumber, etc. It is our understanding that a portion of this structure is currently being rented.

Building B- Building B is the electrical and carpentry shop. Our review of this building and surroundings revealed neat storage of small electrical and hardware items on shelves. One or two lead acid batteries were noted resting on the interior concrete floor; we were informed that these are recycled. There were no signs of contamination or disorder in the building B area.

Building C- Building C is used as a machine shop for a variety of large and small fabrications. This building is fitted with a relatively impervious concrete floor which would serve to reduce accidental introduction of liquid contaminants into the ground from as a result of accidental spillages. One small degreasing tank was noted in the shop area, and the device was fitted with a suitable catchment for leaks or spills.

Building D- Building D, a metal frame structure with concrete flooring, provides additional work space for turning large pieces such as propeller shafts. No evidence of contamination was noted in this building.

Building E- Building E is designated as a steel and pipe fabrication area. The building is of wood frame construction over concrete flooring. No visual evidence for past or ongoing contamination or hazardous materials was noted in this building.

Building F- Office Building serves as administrative center for operation. No evidence of hazardous materials or disposal of these substances.

Building G- Building G serves as a storage building for lubricants and oil.

Of particular interest in Building G is a rectangular access port in the floor which leads to a storm sewer which runs from near the western property boundary to a discharge into the Duwamish River near the marine railway. Duwamish Shipyard has reportedly discussed the potential for accidental spills in Building G entering the storm sewer and finding their way into the waterway, and they have fitted a seal between the cover of the access port and the access port to prevent release in the event of a spill. Key shipyard staff suggest that Department of Ecology and fire officials have given a nod of approval regarding this detail. Our opinion following inspection of this installation is that if the cover is not bolted or otherwise secured so that it cannot be dislodged, the potential exposure to accidental oil discharge remains.

Immediately south of and adjoining Building G is a concrete pad and vehicle fueling area. Discussions with staff document the existence of four underground fuel storage tanks. These tanks vary in age, and include one-1,000 gallon unleaded tank (installed in 1966), one-3,000 gallon diesel tank (installed in 1976), and two-3,000 gallon regular gasoline tanks (installed in 1979). It is our understanding through discussion with shipyard personnel that these tanks are registered with the Department of Ecology in Olympia as required under existing state and federal regulations. Confirmation of the integrity of these tanks or assessment of the potential for leakage or spillage of hydrocarbons into the soil or groundwater could not be accomplished through visual reconnaissance.

Building H- Building H is essentially a covered work area open to the north, and is used for sand blasting of smaller parts. North of the structure, blasting grit was noted on a concrete apron.

Buildings I, J, and K- This complex of structures is used primarily for the storage, mixing and application of paints and finishes of varying composition for use in the yard. A portion of Building I open to the north appears to be the primary mixing area. Here, numerous open buckets of paint were seen. In isolated areas, unused or spilled paint had accumulated in small mounds.

In a wire cage enclosure, a small distillation unit is employed to recover solvents from used paint mixtures. A resulting by-product are "still bottoms" which according to documentation reviewed as part of our study, are manifested and properly disposed of through a licensed dangerous materials recycling and disposal firm. Estimated volume generated by this process is on the order of ten pounds per month according to records.

Buildings J and K are strictly used for paint and solvent storage. Each has a wooden floor and is placarded for safety for no smoking.

As with the underground fuel storage tank area, assessment of the potential for leakage or spillage of solvents or other mixtures used in the Building I-J-K area into the soil or groundwater could not be accomplished through visual reconnaissance.

Grounds

Paved Areas

Aside from the building areas, the remaining land surface in the eastern three-fourths of the property is paved with asphalt.

Duwamish Shipyard, Inc.
July 15, 1987

E-3454
Page Six

The paved areas are used for a variety of purposes which include lay-down or storage of various marine hardware items, rope goods, scaffolding, chain, wire rope, etc. Much material fitting this general description was noted in the eastern end of the paved area close to the waterfront.

A portion of the paved area south of the main office building and proximal to the south property boundary is used for interim storage of used sand blasting grit, which is a black material. Mr. Meberg advised us that the material cycled through this area is covered with plastic while in storage as a precaution against infiltration and leaching by rainwater. Ultimately the spent material is used by another company as a component of cement products which provides a means of disposal and encapsulation of the material. Laboratory analyses of the sand blast material presented for our review did show trace levels of barium, cadmium, copper and zinc, but none of these levels exceeded the thresholds established under the dangerous waste regulations of the State of Washington, Chapter 173-303 WAC for designation as dangerous waste.

Waterfront Marine Railway and Drydock Area

As alluded to in earlier sections of this report, the waterfront of the property has represented the hub of activity for the shipyard since the enterprise was established earlier in the century. Dominant features at the waterfront during our site visit included a marine railway running parallel to the shoreline with launching and retrieval toward the north, a dock parallel to the shoreline and outboard of the marine railway, and two floating drydocks tied to the pier in deeper water.

At the time of our visit the marine railway was vacant. Traces of the black sandblasting grit could be seen in the upper or southerly reaches of the inclined portion of the rail area. Workers were sweeping and shoveling the grit into collection boxes provided for the purpose, presumably to minimize the possibility for the sand to be washed or carried into the Duwamish River. Numerous upright 55-gallon drums were also noted in the paved yard area immediately west of the marine railway. The contents of these barrels was not determined at the time of our site review.

Also visible in the marine railway area was the point of discharge for the storm sewer which extends across virtually the entire length of the property from near W. Marginal Way. The discharge point lies beneath the rails just at northern edge of the wooden planking in the work area of the inclined section.

The dock service area was occupied by numerous pieces of equipment including a mobile tire-mounted crane. Of particular

Duwamish Shipyard, Inc.
July 15, 1987

E-3454
Page Seven

interest from an environmental standpoint was a high capacity vacuum for collection of the blasting grit.

The floating drydocks were both engaged in vessel repair and service at the time of our site visit. Accumulations of the blasting grit were apparent on the floor of each dock. Mr. Meberg explained to us that prior to each launching following sand blasting operations, the docks are cleaned by vacuum to minimize release of this material into the Duwamish. Occasional small iridescent hydrocarbon sheens were noted floating on the surface of the river in the vicinity of the drydocks, but these appeared to originate from sources further upstream.

In summary, with the exception of the minor accumulations of black blasting grit discussed in the foregoing paragraphs, no visual evidence for the presence or release of potentially dangerous or toxic materials was present in the waterfront operation at the time of our reconnaissance. As has also been discussed earlier, laboratory analyses of the blasting sand presented for our review have confirmed that the material is not dangerous according to existing regulations.

Review of Pertinent Documentation

At our request, a total of thirty three documents were forwarded to Earth Consultants for our review by Duwamish Shipyard. A listing of these materials is provided in Table A appended to this report. The documents included newspaper articles, laboratory analyses, communications to and from various government and private agencies, regulatory guidelines and other information. In general, the record reflects active and positive management of environmental issues by the Duwamish Shipyard.

Avoiding meaningless discussion of various smaller details, we will briefly discuss certain points having potential bearing on the environmental history of the subject facility. It is apparent from the record that in 1983, The Municipality of Metropolitan Seattle (METRO) was initiating a program to assess the general environmental health of the Duwamish area called the Duwamish Clean Water Plan. Representing business interests was an industrial coalition called the Duwamish Industrial Council. The Duwamish Shipyard was an active participant in attempts to unify the boat building industry standards with respect to definition of the "state of the art" in the management of sand blasting grit.

According to document #10, on November 15, 1984, Tom Hubbard, Denise Healy and Jim Shahan of Metro visited Duwamish Shipyard. Subjects of discussion at that time included storage of lubricants, fuel, solvents and paint. In addition, the Metro group presented the shipyard a hand written copy of a table of

Duwamish Shipyard, Inc.
July 15, 1987

E-3454
Page Eight

results of laboratory analysis for heavy metals of samples obtained from various areas along the Duwamish including the drydock area at Duwamish Shipyard. The table does not provide documentation as to where the sample was obtained or whether the analytical methods were total metals or EP TOX (WAC 173-303-090). Taken at face value, and assuming the test results were based on EP Tox methods, the results would indicate that the materials would be classified as dangerous. If taken at face value, and assuming the reported concentrations are total metals, and further assuming a maximum procedural dilution factor of 20 in a subsequent EP Tox analysis, only lead and arsenic would be present at levels leading to designation of the material as dangerous waste. In our opinion, the absence of documentation for the precise location for the sample and the absence of a statement regarding the testing methodology erode the credibility of the sample.

Discussions with Don Meberg at the shipyard during our site visit raised a question as to whether or not Metro had made any exploration borings for environmental sampling on or near the subject site. To resolve this question, Earth Consultants environmental staff contacted Mr. Larry West of Sweet Edwards and Associates of Redmond, Washington as he was named in a letter (Document #12) referenced to Metro environmental work in the area. Mr. West confirmed that he was familiar with the project and that no borings or monitoring wells had been installed or sampled on the subject site.

One of the more interesting documents provided by Duwamish Shipyard was an EPA document entitled "Development Document for Proposed Effluent Limitations, Guidelines and Standards for the Shipbuilding and Repair Industry, EPA document 440/1-70/076-b dated December, 1979. The brief document provides specific guidance for management of environmental aspects of the shipyard and drydock business, and according to Mr. Meberg, prior to relatively recent (1983) interest by Metro and others, the referenced document provided the primary source of guidance to the industry and was self-defined as "best management practices".

CONCLUSIONS

Aside from the single cited Metro analysis for heavy metals in the offshore area, and based solely upon the information developed to date from our conversations with various knowledgeable individuals, from our review of relevant documents, and from our reconnaissance of site surficial features, we have observed no evidence for past or ongoing contamination of the subject site with dangerous, hazardous or toxic substances as defined under the Resource Conservation and Recovery Act (RCRA-42 USC - 6901, et seq.), the Federal Water Pollution Control Act (33 USC 1257, et seq.), the Clean Air Compensation and Liability

Duwamish Shipyard, Inc.
July 15, 1987

E-3454
Page Nine

Act (42 USC 2001, et.seq.), and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA: 42 USC 9601, et.seq.).

LIMITATIONS

This report has been prepared for specific application to this project in accordance with generally accepted environmental science practices and in accordance with the terms and conditions set forth in our proposal of July 2, 1987 for the exclusive use of Duwamish Shipyard and their representatives. No other warranty, expressed or implied, is made. As discussed in earlier sections of this report, the scope of work for our review of this site did not include examination, sampling or analysis of subsurface soils or groundwater on the site. The actual condition of subsurface soil or groundwater conditions are not discernable solely on the basis of surficial evidence. If new information is developed in future site work which may include excavations, borings, studies, etc., Earth Consultants should be allowed to reevaluate the conclusions of this report, and to provide amendments as required.

We trust that the information presented in this report will be adequate for your current needs. We appreciate the opportunity of providing environmental consulting services to the project. If you have any questions or if we may be of further service, please do not hesitate to contact us.

Respectfully submitted,
EARTH CONSULTANTS, INC.



Don W. Spencer
Don W. Spencer, M.Sc.
Director-Environmental Services

Robert S. Levinson
Robert S. Levinson, P.E.
President

DWS/dws

Attachments:

Table A Review Documents
Plate 1 Site Map

TABLE A
REVIEW DOCUMENTS

REFERENCE NUMBER	TITLE
1	Boeing Company Letter (10-25-83)
2	Metro On-Site Team qualifications (4 persons)
3	Meeting Summary, Duwamish Ind. Council (8-23-83)
4	Duwamish Contaminants Summary (6 pages)
5	Duwamish Action Plan/Draft
6	Article, SDJC (7-18-83) re; Duwamish Dredging
7	Metro Toxicant Pretreatment Study, (5-84)
8	Meeting-Wash.State Boat Builders (9-17-84)
9	Bibliography-water pollution articles
10	Metro Sample analyses (11-15-84)
11	Article, Seattle Times (12-84) health of Sound
12	Letter: Sweet, Edwards & Assoc.(12-26-84)
13	WDOE letter (1-4-85), Action Plan
14	Letter to Metro (2-6-85) re;Shipyard Env.
15	1984 WDOE Dangerous Waste Activity Form 2
16	Analyses of materials shipped
17	WDOE letter, copper,nickel and zinc MCL's
18-19	Documentation of materials shipped (Chempro)
20-23	Correspondence re; NPDES Permit
24	Article, PSWQA, 6-87
25	WDOE letter 6-5-87 re;video footage at site
26	WDOE letter 6-22-87 re; NPDES permit
27	Lauck's Lab(no date) Blasting Sand Analyses
28	Summary of proposed legislation
29	Interview-Bob Steward/NOAA
30	Public Access Policy-Duwamish Waterway 3-84
31	EPA Guidelines for Shipbuilding and Repair Fac.
32	Plot Plan, Duwamish Shipyard, Inc.
33	Letter 7-2-87 to EPA re;NPDES for shipyards(draft)

WEST MARGINAL WAY

GRAVING DOCK

MARINE
RAILWAY

DRYDOCK

DUWAMISH RIVER

PIER

DRYDOCK

TANKS

0 100 200
FEET



**Earth
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DUWAMISH SHIPYARD
SKETCH MAP

Proj. No. 3454

Date 7-87

Plate 1